

Amendments to the Drawings:

The attached replacement sheet 1/1 replaces the replacement sheet introduced to the application by the July 7, 2004 Preliminary Amendment. Reference numeral "2a" has been added to, and reference numerals "H1" and "H2" have been deleted from, the replacement sheet 1/1.

Attachment: Replacement Sheet 1/1

REMARKS

The Office Action dated August 23, 2005 has been carefully considered. Claims 1 and 5-12 are pending in the application, with claim 1 being the only independent claim. Claims 1 and 5-12 have been amended. Claims 2-4, 13 and 14 have been canceled, without prejudice. Reconsideration of the application, as amended herein and in view of the following remarks, is respectfully requested.

The drawing stands objected to because reference numeral "2a" is not shown therein. Reference numeral "2a" has been added to, and reference numerals "H1" and "H2" have been deleted from, Fig. 2 of the drawing. No new matter has been added. In view of the amendments, withdrawal of the objection of the drawing is respectfully requested.

The specification stands objected to because of the expression "nozzle 12" therein. Applicants have amended the paragraphs beginning on page 1, line 21 and line 42, respectively, as well as the last paragraph added by the July 4, 2004 Preliminary Amendment to correct this informality and to make a few other changes therein. No new matter has been added. In view of the amendments, withdrawal of the objection of the specification is respectfully requested.

Claim 1 stands rejected under 35 U.S.C. §102(b) as anticipated by U.S. Patent No. 1,133,711 (Cornelius). Claim 1 has been amended to include one of the limitations of claims 2-4. Applicants respectfully submit that claim 1, as amended, is not anticipated by Cornelius because Cornelius does not disclose, either expressly or inherently, each and every element as set forth in claim 1.

In particular, Cornelius does not disclose or suggest (a) a nozzle having a mouth cross section at an outlet end, the mouth cross section having a shape of one of an ellipse, a rhombus, and a combination of a circle and an ellipse; and (b) that the nozzle has, from the mouth cross

section to a base area, a shape corresponding to that of a body of revolution of an ellipse or of an oval cross section around a second semiaxis of the mouth cross section, as recited in claim 1.

As shown in Figs. II-IV of Cornelius, the groove 9 formed by two body members 7 of the oil burner tip of Cornelius has a rectangular cross section from a neck portion 10 all the way to insert plates 14 and 17. The groove 15 formed by the insert plates 14 and 17, which extends outward from the groove 9, also has a rectangular cross section until it terminates at a mouth 12 at a free end of the oil burner tip. In addition, as shown in Fig. 1, the oil burner tip of Cornelius has a flat shape from the neck portion 10 all the way to the free end. In contrast, claim 1 recites a nozzle having a mouth cross section at an outlet end, the mouth cross section having a shape of one of an ellipse, a rhombus, and a combination of a circle and an ellipse, and that the nozzle has, from the mouth cross section to a base area, a shape corresponding to that of a body of revolution of an ellipse or of an oval cross section around a second semiaxis of the mouth cross section.

In view of these differences, withdrawal of the §102(b) rejection of claim 1 is respectfully requested.

In addition, claim 1 stands rejected under 35 U.S.C. §103(a) as unpatentable over U.S. Patent No. 5,961,874 (Hasebe) in view of U.S. Patent No. 1,033,195 (Robinson). Applicants respectfully submit that claim 1 is patentable over Hasebe and Robinson because (1) Robinson is not analogous art; and (2) even if Robinson were analogous art, the combination of Hasebe and Robinson fails to teach or suggest all of the limitations of claim 1, and there is no suggestion or motivation to modify Hasebe with Robinson in the way proposed in the Office Action because doing so would render Hasebe inoperative for its intended purposes.

Robinson relates to a flushing nozzle used on flushing wagons used for washing city pavements (see p. 1, lines 9-12 of Robinson). Robinson states that flushing nozzles in its prior art cannot produce a stream of water with equal force along its entire width. Therefore, a particular object of Robinson is to have a flushing nozzle which is operable to discharge a flat broad stream of water with equal force along its entire width (see p. 1, lines 12-18, 42-59, 86-88 of Robinson).

In contrast, the present application relates to an immersion nozzle for guiding molten metal into a metallurgic vessel (see first and last paragraphs of the specification). The problem being addressed by the present application is that prior art immersion nozzles have a weak flow-back, which negatively affects casting slag formation. Therefore, an object of the present application is to have a widening nozzle cross section so that there is a widening of the flow in the casting direction inside the nozzle and a stronger back-flow outside the nozzle which, as a result of a greater heat input, leads to an improved melting of the casting powder located on the surface of a melt (see the fourth paragraph on page 1 and last full paragraph on page 2 of the specification).

Thus, the flushing nozzle of Robinson is not submerged in water and is used to discharge water into air. Back-flow of water over or around its nozzle opening is not a consideration. The immersion nozzle of the present application, on the other hand, is used to cast molten metal into a metallurgic vessel and is submerged in molten metal in the metallurgic vessel during casting. Back-flow of molten metal over or around its nozzle opening is a consideration. Because of these differences and the fact that water and molten metal have very different viscosities and temperature requirements for nozzle materials, Robinson is not in the field of Applicants' claimed invention. Moreover, because of the differences in the problems to be solved, Robinson is not reasonably pertinent to the particular problem with which Applicants were concerned. Thus, Robinson is not analogous art.

Turning to (2), even if Robinson were analogous art, as shown in Fig. 1, it does not teach or suggest that a nozzle has, from a mouth cross section to a base area, a shape corresponding to that of a body of revolution of an ellipse or of an oval cross section around a second semiaxis of the mouth cross section, as recited in claim 1, because Robinson merely discloses or teaches a tapering shape in the relevant portion (see p.1, lines 65-69; Figs. 1-3 of Robinson).

In addition, the Examiner acknowledged in the Office Action (page 4) that Hasebe also does not teach or suggest that a nozzle has, from a mouth cross section to a base area, a shape corresponding to that of a body of revolution of an ellipse or of an oval cross section around a second semiaxis of the mouth cross section. Therefore, the combination of Hasebe and Robinson fails to teach or suggest this limitation of claim 1.

Moreover, Hasebe relates to a submerged entry nozzle 10 (see col. 1, lines 11-13; Fig. 1A of Hasebe). The outlet end of the nozzle 10 has a rectangular cross section. Furthermore, its cross section has an increasing length and a constant small width towards a nozzle bottom part 15 (see col. 2, line 62; col. 3, lines 3-4; Fig.1A of Hasebe). Because of its constant small width, the outlet end of the nozzle 10 can be submerged in a very thin mold so that the nozzle 10 can be used to continuously cast a thin slab or plate without oxidation of molten steel (see col. 1, lines 15-19; col. 4, lines 26-30 of Hasebe). Thus, modifying Hasebe with Robinson in the way proposed in the Office Action would make the outlet end of the nozzle of Hasebe to have an increasing width towards a terminal part 14, which would render the nozzle inoperative for its intended purposes because it cannot be submerged in the thin mold anymore.


In view of the foregoing, withdrawal of the §103(a) rejection of claim 1 is respectfully requested.

Dependent claims 5-12 are patentable for at least the same reasons that independent claim 1 is patentable, as well as for the additional limitations recited therein.

In view of the foregoing, Applicants respectfully submit that the application is in condition for allowance, and such action is respectfully requested.

Respectfully submitted,

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